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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,687	12/28/2001	Gee Sung Chae	2658-0276P	3606

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EXAMINER	
DI GRAZIO, JEANNE A	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 04/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/028,687	CHAE, GEE SUNG	
	Examiner	Art Unit	
	Jeanne A. Di Grazio	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

Priority to Korean Patent Application No. P2001-31514 (June 5, 2001) is claimed.

Election/Restrictions

Applicant's election with traverse of Group I (claims 1-11) in Paper of January 5, 2004 is acknowledged. The traversal is on the ground(s) that, as stated by Applicant, "[f]urther, method claim 12 is a method of forming the liquid crystal display of claim 1, and claim 12 contains all of the limitations found in independent claim 1." (Response of January 5, 2004 at Page 2). Because as Applicant acknowledges that "claim 12 contains all of the limitations found in independent claim 1" and "method claim 12 is a method of forming the liquid crystal display of claim 1" the requirement for restriction is withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7, 8, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Rho et al. (US 6,057,896).

Per claim 1: Rho discloses a liquid crystal display and TFT substrate that, with reference to Figure 3, has the following elements: a gate electrode (20) over a substrate (10), a gate insulating film (40) entirely deposited over the substrate (10) to cover the gate electrode (20), an active layer (50) formed on the gate insulating film (40) which overlaps with the gate electrode

(20), an ohmic contact layer (71 and 72) formed on the active layer (50), a source electrode (80) formed on the ohmic contact layer (71) a drain electrode (90) formed on the ohmic contact layer (72), the drain electrode (90) being opposed to the source electrode (80) to form a channel (Column 4, Line 55), a protective layer (100) covering the source (80) and drain (90) electrodes, a storage electrode (30) formed at a pixel cell area of a same layer as the gate electrode (20), and a pixel electrode (140) formed to oppose the storage electrode (30) having the gate insulating film (40) in between the pixel electrode (140) and the storage electrode (30), and the pixel electrode (140) being electrically connected with the drain electrode (90)(See also Detailed Description of the Embodiments at Column 5, Lines 13-16)(explaining that the pixel electrode is electrically connected to the drain electrode through the contact hole and receives the display signal from the drain electrode to drive the liquid crystal molecules).

As to claim 2, Rho teaches that conventionally, the source electrode (90) is connected with the data line (not shown in Figure 3)(Column 1, Lines 35-36).

As to claim 7, Referring again to Figures 2 and 3 (same embodiment), a data line (81) is perpendicular to a gate line (21) and source (80) and data line (81) are connected.

As to claim 8, In Rho, the gate electrode (20) is a branch of the gate line (21) as shown in Figure 2 (same embodiment as Figure 3) and thus the gate electrode, gate line, and storage electrode are all formed in the same layer.

As to claim 11, The protective layer (100) comprises an organic insulating material (Column 4, Lines 56-60)(See also Column 5, Lines 1-4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-4, 9 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Shimada et al. (US 6,424,399 B1).

Per claims 3-4, 9 and 13-15: Rho does not appear to explicitly specify that the source and drain electrodes further comprise a buffer metal layer of molybdenum, titanium, or tantalum.

Shimada teaches and discloses an active matrix substrate and liquid crystal display in which a conventional liquid crystal device has source and drain electrodes made of titanium or molybdenum (Column 2, Lines 23-32). It may be presumed that the molybdenum or titanium source and drain electrodes reduce contact resistance.

Shimada is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to include a source and drain electrode of molybdenum or titanium for continuity of contact hole thereby contributing to excellent image characteristics (Column 8, Lines 4-13).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Shimada for source and drain electrodes of molybdenum or titanium for continuity of contact hole thereby contributing to excellent image characteristics (Column 8, Lines 4-13). .

Claims 5, 10, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Jeong (US 6,137,551).

Per claims 5, 10, 16 and 17: Rho does not appear to explicitly specify that the storage electrode is made of a transparent conductive material such as indium tin oxide.

Jeong teaches and discloses a conventional liquid crystal display and conventional thin film transistor array in which a storage electrode is made of indium tin oxide (Background of the Invention at Column 2, Lines 41-44).

Jeong is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to form a storage electrode of a transparent conductive material such as indium tin oxide for a storage capacitor having a high aspect ratio (Title, entire patent).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Jeong for a storage electrode of indium tin oxide for a storage capacitor having a high aspect ratio.

Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Shimada et al. (JP-03-141325).

Per claims 6 and 18: Rho does not appear to explicitly specify that an auxiliary storage electrode is connected to the storage electrode.

Shimada teaches and discloses a liquid crystal display device and method of its formation in which an auxiliary electrode is connected to a storage capacity electrode (Patent Abstracts of Japan). The auxiliary electrode is connected to the storage capacity electrode to (1) decrease electrical resistance of the storage capacity electrode and (2) decrease the time constant of the

storage capacity electrode (Abstracts). With such a connection, charging characteristics of the storage capacity are improved and contrast is also improved (Abstracts).

Shimada is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to connect an auxiliary electrode to a storage electrode to (1) decrease electrical resistance of the storage capacity electrode and (2) decrease the time constant of the storage capacity electrode (Abstracts).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Shimada to connect an auxiliary electrode to a storage electrode to (1) decrease electrical resistance of the storage capacity electrode and (2) decrease the time constant of the storage capacity electrode (Abstracts) and to thus improve charging characteristics of the storage electrode and thus improve contrast.

Claims 12, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896).

Per claim 12: Applicant's recited method steps of fabricating a liquid crystal display would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made in light of the device as taught and disclosed by Rho.

As to claims 19 and 20, the protective layer comprises an organic insulating material (Column 4, Lines 56-60)(See also Column 5, Lines 1-4).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeanne Andrea Di Grazio

Patent Examiner
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